

1. Consider the curve  $C$  in  $\mathbb{R}^2$  given by the parameterization  $\mathbf{r}: [0, \pi] \rightarrow \mathbb{R}^2$  where

$$\mathbf{r}(t) = (2 - 3 \cos t, 2 + 3 \sin t)$$

- (a) Sketch the curve  $C$ . Include the coordinate axes in your picture for scale. (2 points)

- (b) For  $f(x, y) = x^3 + y$ , reduce the line integral  $\int_C f \, ds$  to an ordinary definite integral (something like  $\int_0^2 t^2 \sin t \, dt$ ), but do not evaluate it. (2 points)

2. Consider the curve  $C$  which is the darker portion of the hyperbola  $x^2 - y^2 = 3$  between the two marked points. Give a parameterization  $\mathbf{r}$  of  $C$ , indicating the domain so that it traces out precisely the segment indicated. (3 points)

